

What is claimed is:

1. A method for blending two or more fluid components, wherein N is the number of fluid components comprising:
  - (a) continuously measuring, accumulating and storing flow information on at least N-1 fluid components blended since the start of a blending process,
  - (b) calculating the concentration of at least N-1 fluid components in the total blended volume of fluid,
  - 10 (c) continuously comparing the calculated concentration of the fluid components in the total blended volume against a blend recipe for fluid component concentrations, and
  - (d) continuously adjusting flow rates for at least one fluid component to achieve the desired concentration of each component in the total blended volume,
- 15 whereby continual control of the concentration of the measured fluid component in the total blended fluid volume.
2. The method of claim 1 further comprises receiving information at the start of the blending process wherein the information includes the blend recipe.
3. The method of claim 1, further comprising initiating a flow of individual components to prescribed blend ratios from the blend recipe.
4. The method of claim 1, further comprising terminating the flow of the components at the end of the blending process.
5. The method of claim 4 wherein the blend process is terminated based on information received at the start of the blending process and during the blending process.
- 25 6. The method of claim 1 further comprises receiving information required for the blending process wherein the information is communicated by one or more of the devices selected from the group consisting of a computer, key pad, switch, monitor, sensor mechanical preset, electronic preset, programmable logic controller (PLC), terminal automation system (TAS), and combinations thereof.
- 30 7. The method of claim 1 that further comprises communication information about the blending process wherein the information is communicated to one or more

of devices selected from the group consisting of a visual signal, audible signal, monitor, computer, PLC, TAS, and combinations thereof.

8. The method of claim 1 wherein fluid components are selected from the group consisting of ethanol, gasoline, methanol, methanol / butyl alcohol, multi-component alcohol, butane, ethyl-hexyl nitrate, diesel fuel, dimethyl ether, heating oil, oxygenate blending, RVP blending, emulsified fuels, hydraulic and gear fluids, and various other industrial fluids, and combinations thereof.

5 9. The method of claim 1 wherein the fluid component flow is measured using a flow meter.

10 10. The method of claim 1 wherein the fluid component flow rate is controlled using a control valve.

11. An apparatus for blending two or more fluid components, wherein N is the number of fluid components, comprising:

15 (a) N inlets that supply the individual fluid components into the blender,

(b) piping for transporting the components through at least one mixing location, and transporting the blended fluid to a blender output;

(c) a means for measuring flow through the piping such that the flow of at least N-1 components can be calculated;

(d) a means for controlling flow rates such that the flow of each fluid

20 component from the N inlets can be independently varied to control the concentration of the individual components in the blended fluid at the output of the blender; and

(e) a blender controller suitable for executing a control method, wherein the controller is adapted to:

25 (i) receive information to start the blending process,

(ii) continuously measure, accumulate and store flow information since the start of a blending process, and calculating the concentration of at least N-1 fluid components in the total blended volume of fluid,

(iii) continuously compare the calculated concentration of the

30 components in the total blended volume against a recipe for component concentrations, and

(iv) continuously adjust flow rates to achieve and maintain the desired concentration of each component in the total blended volume since the start of the blending process,  
resulting in a blending system capable of accurately blending two or more  
5 components to a desired blend recipe.

12. The apparatus of claim 11 wherein the information received by the control method to start the blending process includes information about the blend recipe.

13. The apparatus of claim 11 wherein the means for measuring flow are flow meters.

10 14. The apparatus of claim 11 wherein the means for controlling flow are control valves.

15. A method of blending two or more blend components comprising:  
(a) receiving information about a blend recipe into a system control means;  
(b) initiating a flow of individual components by the system control means  
15 to a prescribed blend ratio from the blend recipe;  
(c) continuously measuring flows and calculating concentrations of the individual components in the total blended volume since the initiation of fluid flow;  
(d) continuously comparing the calculated concentrations to the concentrations of the blend recipe and continuously adjusting flow rates based upon  
20 the comparisons to achieve and maintain the blend recipe concentrations; and  
(e) terminating the flow of the components based upon at least one of the following: having reached a total blended volume that is at least the desired batch size, receiving an input signal to terminate blending.